UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/337,824	06/22/1999	ELLIOT KARL KOLODNER	UK998094	9535

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EXAMINER
NGUYEN, DUSTIN

ART UNIT	PAPER NUMBER
2156	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.		Applicant(s)	
Office Action Summary	09/337,824		KOLODNER ET AL.	
	Examiner		**Art Unit**	
	Dustin Nguyen		2156	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely. .
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _22 June 1999_ .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
    closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-27_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-27_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
    application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)		4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .	
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)		5) ☐ Notice of Informal Patent Application (PTO-152)	
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .		6) ☐ Other:	

DETAILED ACTION

1.   Claims 1 – 27 are considered for examination.

Drawings

2.   The drawings are objected to under 37 CFR 1.83(a) because they fail to show step 4.8 of

Figure 4 as described in the specification on page 14, line 20. Any structural detail that is

essential for a proper understanding of the disclosed invention should be shown in the drawing.

MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply

to the Office action to avoid abandonment of the application. The objection to the drawings will

not be held in abeyance.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4.   Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter

which was not described in the specification in such a way as to enable one skilled in the art to

which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The subject matter of "deleting from the thread heap one or more local objects when they are not

a local root" is not described in the specification.

5.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6.   Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing

to particularly point out and distinctly claim the subject matter which applicant regards as the

invention.

7.   Claim 6 recites the limitation "a thread heap" in claim 1. There is insufficient antecedent

basis for this limitation in the claim. Claim 6 fails to point out whether it is the same or different

thread heap from claim 1.

Claim Rejections - 35 USC § 102

8.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999

(AIPA) do not apply to the examination of this application as the application being examined

was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C.

122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment

by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

9.   Claims 1-7, 14, 16, 17, 22-27 are rejected under 35 U.S.C. 102(e) as being anticipated by

Kolodner et al. (US Patent No 6289360).

10.   As per claim 1, Kolodner discloses the method of managing memory in a multi-threaded

processing environment including respective local thread stacks and heaps and a global heap

comprising:

        creating an object in a thread heap (e.g. col 1, line 44-46); and

        monitoring whether the object is a local root (e.g. col 2, line 5-8 and line 13-15).

11.   As per claim 2, Kolodner teaches

        associating a local status with the object (i.e. Async, Sync1, Sync2) (e.g. col 9, line 28-

30 and line 33-36);

        changing the status of the object to global under certain conditions (i.e. whiteColor and

blackColor) (e .g. col 8, line 50-53 and col 11, line 46-47).

12.   As per claim 3, Kolodner teaches the method further comprising deleting (i.e. garbage

collect) from the thread heap one or more local objects when they are not reachable from a local

root (e.g. col 2, line 8-11).

13.   As per claim 4, Kolodner teaches the reachability is determined by tracing from the local

root (e.g. col 2, line 8-10).

14.   As per claim 5, Kolodner teaches the status of an object in the thread heap is changed to

global if the object is assigned to a static variable (e.g. col 9, line 56-60) or if the object is

assigned to a field in any other object.

15.   As per claim 6, Kolodner teaches the method further comprising intercepting assignment

operations to an object in a thread heap to access whether the object status should be changed (

i.e. changed object graph) (e.g. col 2, line 19-27).

16.   As per claim 7, Kolodner shows the multithreaded processing environment is a virtual

machine (e.g. Figure 2, item 28).

17.   As per claim 14, Kolodner teaches certain objects are associated with a global status on

creation (e.g. col 8, line 58-65).

18.   As per claim 16, Kolodner discloses the method further comprising the step of analyzing

whether an object is likely to be made global and associated such an object with a global status

on creation (e.g. col 4, line 26-41).

19.   As per claim 17, Kolodner teaches the method further comprising allocating objects

assigned as global on creation to the global heap (i.e. whiteColor) (e.g. col 3, line 59-65).

20.   As per claims 22-27, they are rejected for similar reasons as stated above. Furthermore,

Kolodner discloses the functions and elements above can be performed in a computer program

product and computer system.

Claim Rejections - 35 USC § 103

21.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

22.   Claims 8, 9 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Kolodner et al. (US Patent No 6289360) in view of Fresko et al. (US Patent No 5966702).

23.   As per claim 8, Kolodner does not disclose the limitation of the claim. Fresko discloses

the virtual machine comprises an interpreter (e.g. col 3, line 7-9) and the write operation code in

the interpreter is modified to perform the checking of assignment of the object (i.e. verifier) (

e.g. col 37, line 7-33). At the time the invention was made, it would have been obvious to a

person skill in the art to combine Kolodner and Fresko because linking-time verification

enhances the performance of the interpreter (e.g. Fresko, col 36, line 14-15).

24.   As per claim 9, Kolodner does not disclose the limitation of the claim. Fresko discloses

the virtual machine comprises a just in time compiler (e.g. col 3, line 10-11) wherein native

compiled (e.g. col 3, line 36-40 and Figure 1, item 106) write operation code includes native

code to perform the checking of assignment of the object (e.g. col 37, line 53-56). At the time

the invention was made, it would have been obvious to a person skill in the art to combine

Kolodner and Fresko because linking-time verification enhances the performance of the

interpreter (e.g. Fresko, col 36, line 14-15).

25.   As per claim 15, Kolodner does not disclose the limitations of the claim. Fresko

discloses certain objects include class objects (e.g. col 16, line 5-9), thread objects (e.g. col 16,

line 41), and runnable objects (e.g. col 29, line 40-41). At the time the invention was made, it

would have been obvious to a person skill in the art to combine Kolodner and Fresko because

object can be easily and affordably adapted to meet new needs.

26.   Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kolodner et

al. (US Patent No 6289360) in view of Fresko et al. (US Patent No 5966702), and further in

view of O'Connor et al. (US Patent No 5953736).

27.   As per claim 10, Kolodner and Fresko do not disclose the method further comprising

using spare capacity in the object header for the flag. O'Connor discloses the above limitation (

e.g. col 13, line 48-52). At the time the invention was made, it would have been obvious to a

person skill in the art to combine Kolodner, Fresko and O'Conner because memory space is fully

utilized by removing unused objects to save space for new objects.

28.   As per claim 11, Kolodner and Fresko do not disclose the limitation of the claim.

O'Connor discloses the method further comprising using multiples of 2 or more bytes in a thread

heap to store the objects (e.g. col 13, line 48-52) whereby there is at least one spare bit in the

object length variable and using the at least one spare bit as the flag (e.g. col 13, line 60-65). At

the time the invention was made, it would have been obvious to a person skill in the art to

combine Kolodner, Fresko and O'Conner because memory space is fully utilized by removing

unused objects to save space for new objects.

29.   As per claim 12, Kolodner does not disclose the limitation of the claim. Fresko discloses

the method further comprising moving objects whose status is global from the thread heap to a

global heap (i.e. shared object) (i.e. Abstract, line 9-15). At the time the invention was made,

it would have been obvious to a person skill in the art to combine Kolodner and Fresko because

memory space is fully utilized by removing unused objects to save space for new objects.

30.   As per claim 13, Kolodner and Fresko do not disclose the method further comprising

compacting the reachable local objects in a thread heap. O'Connor discloses the above

limitation (e.g. col 2, line 13-18). At the time the invention was made, it would have been

obvious to a person skill in the art to combine Kolodner, Fresko and O'Conner because it

reduces the complexity inside memory structure.

31.   Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kolodner et

al. (US Patent No 6289360) in view of Jagannathan et al. (US Patent No 5692193).

32.   As per claim 18, Kolodner discloses the method of managing memory in a multi-threaded

processing environment comprising:

      creating an object in a thread heap (e.g. col 1, line 44-46); and

      monitoring whether the object is a local root (e.g. col 2, line 5-8 and line 13-15).

      Kolodner does not disclose the multi-thread processing environment including respective

local thread stacks and heaps and a global heap. Jagannathan discloses the above limitation (e.g.

Figure 5, items 31, 33, and 35). At the time the invention was made, it would have been

obvious to a person skill in the art to combine Kolodner and Jagannathan because the

architecture helps to eliminate the redundancy objects in the local heaps and also memory

resources are freed up for other operation purposes.

33.   As per claims 19-21, they are rejected for similar reasons as stated above.

Conclusion

      Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Dustin Nguyen whose telephone number is (703) 305-5321. The
examiner can normally be reached on Monday – Friday (8:00 – 5:00).

      If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Alvin Oberley can be reached on (703) 305-9716.

      Any inquiry of a general nature or relating to the status of this application or proceeding
should be directly to the receptionist whose telephone number is (703) 305-3900.

Dustin Nguyen

JOHN A. FOLLANSBEE
PRIMARY EXAMINER